

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization International Bureau



(43) International Publication Date
16 September 2004 (16.09.2004)

PCT

(10) International Publication Number
WO 2004/079051 A1

(51) International Patent Classification⁷: C25B 9/00, C25C 7/00, C25D 17/00, B23H 11/00

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:
PCT/US2003/006601

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(22) International Filing Date: 4 March 2003 (04.03.2003)

Declaration under Rule 4.17:

— *of inventorship (Rule 4.17(iv)) for US only*

(25) Filing Language: English

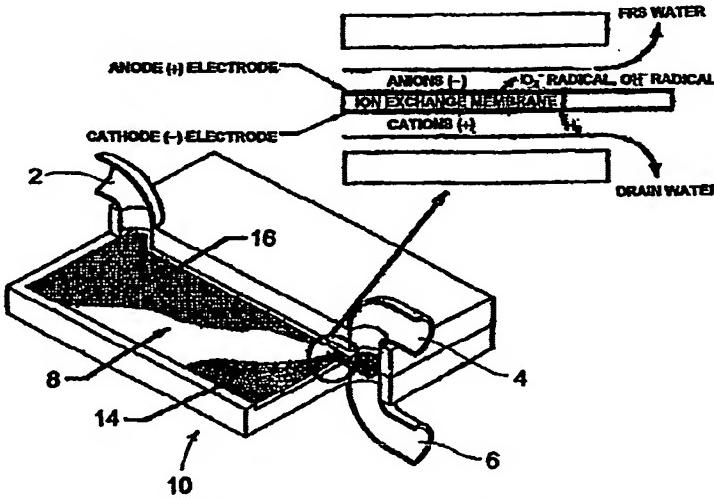
Published:

— *with international search report*

(26) Publication Language: English

[Continued on next page]

(54) Title: HIGH ELECTRIC FIELD ELECTROLYSIS CELL



WO 2004/079051 A1

(57) **Abstract:** A High Electric Field Electrolysis (HEFE) cell is provided for electrolyzing water to transform it into Free Radical Solution (FRS) water for cleaning, deodorizing, and sterilizing. The HEFE cell is comprised of a pair of flat electrodes attached (or coated) onto a flat proton ion exchange membrane enclosed in a corresponding structure that accommodates the electrodes and the proton ion exchange membrane. The structure is comprised of at least one inlet channel for receiving purified water and two outlet channels for output of electrolyzed FRS water and hydrogen rich water. The HEFE cell further provides a mechanism for recycling of hydrogen rich water for re-use or electric power generation. The quantity and the quality of FRS water production is controlled with an external control circuit that automatically monitors and maintains appropriate parameter values for the production of FRS water.